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Quaternary landforms in the Danish sector of the southern North-Sea depicted in 3D-seismic data

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By the end of the Tertiary the climate conditions got cooler and more changeable. During the Quater-nary the climate all over Europe was characterized by an alternation between glacial and interglacial conditions. Despite a long history of investigation, several critical issues regarding the glacial history of Northwest Europe – in particular the marine areas - remain unsolved.

Here we present the evolution of the quaternary landscape from the base of the Quaternary to the present sea-floor, as depicted in seismic data from the central part of the Danish North Sea sector. The 3D seismic volume, provided by Maersk Oil and Gas and DUC partners, covers an area of approx. 2000 km^2 located about 200 km westward of the Danish mainland between 4° to 5° eastern longitude and close to 56° northern latitude.

At present, the sea-floor of the area is situated about 50 meters below sea level. During the early and middle Holocene, when the study area was exposed to terrestrial conditions, a fluvial system devel-oped in the southern part of the study area.

This fluvial system is underlain by up to 1.5 km wide, incised and today buried tunnel valleys of most likely Weichselian age that extend over several kilometres in north – south direction. We believe that this is the first documentation of Weichselian tunnel valleys in the subsurface of the study area. Since a primary requirement for the formation of sub-glacial tunnel valleys is the presence of a melting ice sheet overlying a poorly consolidated substrate, we conclude that the Weichselian ice-sheet extended further southward than proposed in earlier ice-sheet reconstructions for the Danish part of the North Sea.

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